THE ZOOLOGIST

No. 746.—August, 1903.

FIELD NOTES (BEING A NATURALIST'S DIARY OF OBSERVATION AND REFLECTION).

BY EDMUND SELOUS.

1899.

September 28th.—A Green Woodpecker this morning flew down on to one of the flower-beds in my garden, and was there some time. The flowers, however, prevented me from seeing, and when I tried to stalk it, it saw me first and flew off. My garden and meadow is part of this Woodpecker's preserve, and as the open sandy space, which I have called the amphitheatre, is just opposite my house, across the river, and as I have seen the bird that there haunts fly to some trees only a little beyond my boundary, I fancy that the two are identical, making one individual who hunts round, daily, in a moderately wide circle. Most animals, I suppose, have their regular hunting-grounds. This seems to be the case with Tigers in India, however extensive and varied and liable to sudden and complete change their field of operations may be. It is the same, no doubt, with Lions, who would, probably, not wander beyond a certain district they were accustomed to if the game in it did not become scarce. Thus we have the great instinct of conservatism which in beasts shows itself much in this way. The right path for them is the one in which they have been accustomed to roam. To change it requires an effort which, till some force arises sufficiently powerful to compel them to make, they will not make—and so with men. Change is, in fact, a great discomfort; even when it makes no difference to us outwardly, yet to think of it is upsetting to the mind. So the world moves slowly, but the wonder, perhaps, is that it moves at all.

I was watching some Swallows to-day flying about over a sandy meadow, when a white butterfly that looked like a belated cabbage one suddenly disappeared, engulphed by one of them. It is not often that one sees a Swallow take so large an insect. In fact, I cannot myself make out that butterflies are much preyed upon by birds; they are not sufficiently so, at any rate, for the fact to be forced upon one. It may be true that they fell victims when introduced into parks, but here the conditions were somewhat artificial. The bird that outnumbers all others in our parks —or, rather, monopolizes them—is the Sparrow, and Sparrows, especially London Sparrows, are "like French falconers—fly at anything." The novelty, I think, too, must have had something to do with it. Butterflies are thought to be scarce in England, compared with continental countries. It is collectors, in my opinion, rather than the birds, who keep them down. Is there any other country than this where almost every boy has a box or two of worthless, dry, stuck things, or any where men continue so long to be boys, intellectually speaking? And then why speak of the Continent as if it were all one? In Italy, indeed—perhaps because the people are starved for the country to be a great power—bird-life is deplorably scarce; at least, I am told so. The Germans, however, are great bird-lovers, and where I was, at any rate, birds seemed to me much more abundant than here, both in species and individuals. So, too, did insects. People who think that the abundance of a preying species must mean the scarcity of species preyed upon seem to me to forget a few facts, as *e. g.* the state of South Africa when the Dutch first began to colonize it; the far greater numbers, formerly, of fish in the Thames when Otters were also much more plentiful; the teeming myriads of fish in the sea all eating each other, or being eaten by hosts of Seals and birds. The law, indeed, would seem to be, as one might expect, that an abundance of the eater goes hand in hand with a much greater abundance of the eaten, and this law holds good, as a rule, till civilized man steps upon the scene to upset, with greed, sport, and collecting, the balance of nature. The vast herds of Bison that once roamed over the North American

BRITISH MUSEUM

continent maintained their numbers in spite of the savage, though his powers of destruction were greater than those of an animal. So did the Grizzly Bears, but with the advent of the civilized savage all was quickly changed. And this universal destroyer, who, wherever he goes, is responsible for the disappearance of all animal and much of vegetable life, fixes his basilisk eye upon some very inferior imitation of himself, and cries, "Hold! enough!" This is a thing to make the gods laugh, perhaps; but, for myself, "my gorge rises at it."

October 10*th.*—Whilst watching some Starlings feeding in my meadow this morning the glasses suddenly revealed to me a Green Woodpecker quite near—indeed, almost amongst them. I watched this bird with the closest attention for perhaps a quarter of an hour, during the whole of which time it was on the ground searching for food. Its actions were almost identical with those of the Starlings themselves—that is to say, it continually thrust its beak into the grass—probably the soil also—and withdrew it. The Starlings shortly flew away, leaving the Woodpecker hunting by himself. In a minute or two he flew to a little grassy mound just at the corner of my orchard (which has about three trees with little or no fruit), and this he commenced to probe and search in the most thorough manner. He then flew into a small tree in the orchard-hedge, where I lost sight of him. Some five or ten minutes afterwards another flock of Starlings descended on the field, and immediately the Woodpecker reappeared, flying towards them from the hedge, and went right down amongst them. Unfortunately the crest of a little rise concealed most of the birds as they touched the ground, and amongst them the Woodpecker. But such a bird as a Woodpecker associating itself with Starlings, and searching the fields in company with them, seems to me very interesting. The Starlings, however, soon flew off again, leaving their distinguished companion as before. I now walked to the little hillock, and, stooping down, looked carefully at it, before laying a hand on the grass or disturbing it in any way. I soon observed two little holes amidst the long thin grass, and, following them down, found the earth, at the bottom of each, broken and pierced into to a slight depth, not more than about a quarter of an inch. But, carefully examining the broken earth, I could not discover any insect or other creature, which, however, does not at all prove that the Woodpecker may not have done so.

November 3rd.—This morning, whilst being driven to the station, I came upon a Green Woodpecker pursued by a Hawk, and uttering loud cries. The Woodpecker seemed almost in the grasp of the Hawk—the two were certainly touching—but it managed to get clear, perhaps aided by the rattling by of the trap, and the Hawk then flew off in another direction. This Hawk was of a light bluish or bluish-grey colour, and seemed hardly, if at all, larger than the Woodpecker. It must therefore, I think, have been a Merlin. I should be glad to think I had aided in the Woodpecker's escape, for it is distressing to think of such a bird being done to death in such a way.

November 11th.—This morning I watched Starlings feeding for some time on the lawn of a house at Richmond, where I was staying. Their *modus operandi* is to thrust the beak repeatedly and all about into the grass, at the same time opening the mandibles, and continuing to open and close them under the soil. They thus, as I suppose, search particularly the roots of the grass, though in many, if not in all, cases they must go deeper down into the soil underneath, since they wedge the bill in right up to the base. They must be searching about, and biting at anything they feel, to get "a taste of its quality." After some time I went out and examined the grass where these Starlings had been. It was quite covered with little round holes that their beaks had made. I probed many of these with a skewer, the depth of most being about what I should judge to be the length of a Starling's beak. Some, however, were much shallower, and here they seemed to have searched merely the immediate roots of the grass. I dug down with my fingers into many of these holes to see if they continued, as the burrows of worms, but this was not the case in any instance. The tactics therefore of Starlings and of Thrushes or Blackbirds in procuring food on the lawn are quite different. The latter strike at a worm when they see it lying with its head in the mouth of its burrow, and then, if successful, pull it out by hopping backwards, as everyone knows. The former search everywhere on chance, and make up for the want of assurance by the continuity of their efforts. Whilst watching the Starlings, here, I once or twice saw them pull up a small worm, or part of one, and on other lawns I have seen them, through the glasses, get fat white or whitish-grey grubs, which had no doubt lain amongst the grass-roots. Such grubs, it is to be presumed, do much damage, so that the Starlings, by destroying them, must be a benefit to gardens. *En revanche*, they certainly eat fruit, but very crowded orchards co-exist, in the West of England, with immense flights of Starlings, and whilst fruit is only to be procured in the autumn, worms, slugs, insects and their larvæ, are destroyed throughout the year. Starlings are nothing like so plentiful in Suffolk, where I live, as they are in the neighbourhood of Gloucester and Cheltenham, and fruit, especially orchard fruit, is in the same relative proportion. To me it seems that the one is a corollary of the other, and, if so, why need fruit-growers be afraid, seeing that the very abundance of the Starlings proceeds from the abundance of their apples and pears? Certainly they lose something, but how ample is the margin of profit, and how must this be increased by the multitude of insects slain all the year round! But they cannot see it in this way. This is not all theory. I have watched numbers of Starlings in a great orchard, and for every one that was pecking a pear there seemed to me to be hundreds of thousands of pears untouched; whilst all about stood great baskets crammed with them to overflowing. The birds have simply not time, and are not sufficiently gathered in any one spot to do much damage in proportion to the huge amount of fruit, and what they do do I believe they pay for, for they feed all day long over the grass-fields. Again, it is asserted that the roosting of Starlings in such great numbers destroys the woods. I do not know what the evidence of this is. In the roosting-place that I am best acquainted with there is certainly a pungent smell, but everything seems growing in the same way as elsewhere. Moreover, however large the numbers, the actual space required for their sleeping accommodation is very small. The fact is that the mere sight of birds or other animals congregated together in great numbers has an irritating effect on very many people. They are moved not so much to interest and observation as to "slaughterous thoughts." "They want thinning," "We could do with a few less of them," &c. In fact, the deep-seated instinct of killing—which is all that "sport" really is—is aroused by the sight of so much that might be killed, and to this is added, where actual depredation is witnessed, a feeling of hatred, and desire for revenge. There can be no impartiality or discrimination in such an atmosphere, no balancing of the arguments. The defence is unpopular, and a cold ear is turned to any witness for it.

November 22nd.—Back at Icklingham. A Rabbit to-day ran suddenly out of a bush, and almost over a Moorhen that was feeding near it, for the bush edged her pond. I do not know whether this was accidental on the part of the Rabbit, or a demonstration, as in the case of the Stock-Dove. The Moorhen was at first quite alarmed, but recovered herself, and could soon browse calmly again.

November 24th.—This morning I noticed two male Pheasants engaged in hostilities, or, rather, in threatening them. They crouched opposite each other, the feathers of their breasts just touching the grass, and about a foot apart. In this position each would dart the beak forward, and, as it almost touched the opposing bird's, retire it again. The lunge, however, was not made fiercely, but in a timid, half-hearted manner, as though either bird would be glad of a good excuse for withdrawing from the business. This seemed to be particularly the case with one of them, who at every little pause rose and began to walk away with a half-dignified, half-unconscious appearance. But, upon this, the other would always make a run at him, when he would instantly front round and crouch into the same position, which his opponent likewise assuming, the same proceedings recommenced. As the wish of the one bird to retire became more marked, the rushes of the other grew fiercer, but a very little facing about was sufficient to quell this martial ardour. "Resist and I retire; retire and I pursue," seemed to be the motto. It was a Nym and Pistol affair, and a passing cart put an end to it. This is strange fighting. I would all men were such warriors. When these Pheasants were thus crouched before one another, the tail of one of them was raised almost straight up in the air, and expanded. This, however, I soon concluded to be the wind. Perhaps I was mistaken, but the other one, who faced the wind, had his tail straight out along the ground.

December 8th.—I spent a cold half-hour to-day in watching Rooks feeding in a meadow. Several found something which looked, as they held it in the beak, like an acorn or oak-apple. This they placed on the ground, and, without holding it with the feet, hammered at it powerfully with the beak. To me it seemed that at each blow the beak was thrust into the earth, that there was spade as well as pickaxe action—at least with one bird that I watched, as well as I could, through the glasses. I could not make out that this Rook broke up and ate the object, whatever it was, and as he shortly walked away without it, it struck me that he might have buried it, as a Squirrel does his store. A second Rook, however, broke and ate, as well as I could see, a portion of what he had, and a day or two before I had seen another one, at the same place, do the same. A third, having pickaxed the ground a little, had all at once something—I think, an acorn—in his bill, which he swallowed whole. Walking to the spot, I found the rind of two acorns, and, as both of these could not have belonged to the one he swallowed, it is probable that neither did. Now, as the Rook swallowed the acorn whole, the blows with the beak were not given to break it, one would think. It looks as if it had dug up and swallowed a previously buried one. Twenty-five paces away there was an oak-tree, and under it I found quantities of acorns with pieces hacked out of them, and having the appearance of having lain some time after they had been thus treated. Probably the Rooks, having found an abundance, had eaten daintily. I think they bury acorns, but could not see to be sure of it.

December 9*th*.—Leave home at 7.15 a.m.

7.20.—First twitter of a small bird.

7.35.—First Rook seen flying, laboriously and alone. There is twittering of small birds in the fir-trees and copses, but none about yet.

7.40.—Rooks flying, and a Blackbird goes up from the road, with its expostulation-note. Small birds now begin to fly from tree to tree, along a row of firs—Chaffinches, Greenfinches, Tits, &c. Wretched poor notings these for a naturalist, or any man, to make, but I do not know what he can find better in a country like this at this time of year, and of the morning. England is a wretched place except for the very rich and the very patriotic.

7.47.—Rooks now flying very high, in opposite direction to West Stow, where they roost. A Blackbird—male, I think—

flies from the ground in silence, though put up by me. Another one—a cock this time for certain—does the same, with a very modified note, querulous and chattering—nothing like the well-known one, the alarm-note, as it is called.

About 8, great bands of small birds are in full activity. They are pillaging a straw-stack, to the sides of which they cling, and, on being disturbed, fly from it, in a cloud, to some fir-trees near, and then backwards and forwards at intervals. Their wings, all vibrating together, make a powerful whirring noise, which is at its maximum as they rise together in a cloud, lessening as they spread out, ceasing suddenly as they whirl into a tree or on to the ground again.

A Pheasant walking and feeding quietly by the side of the stack. Partridges scattered about the stubble-field, and beginning now to feed over it. Two Rooks, perched side by side on a tree, are like bits of black night staying after the rest has fled. The small birds making the flocks are Chaffinches, cock and hen (the latter largely predominating, but on a thorn-bush I see two cocks and six hens) Greenfinches (mostly hens, I suppose, yet yesterday there was a great show of green as they rose) and Yellowhammers—but these in twos and threes.

Two little Golden-crested Wrens are flying from fir to fir, and pecking about the bark, as if for insects. Yet what can they get on the 9th of December, and a cold frosty morning? From the little stream comes a peculiar trumpety note, made, I believe, by a Mallard, for, looking in the direction it came from, I saw a bird on the water, and, walking there a little afterwards, put a female Mallard up. This great flock of small Passeres is now perched all over an oak-tree, which looks in leaf and life again—a feathered foliage. How *bizarre* is colour, in the dead of winter, here! All that I can see now are Chaffinches and Greenfinches, and both sexes are well represented. This is apparent, for the tree is full of colour, and it is only the cocks that make it. Two—one of each kind—are sitting side by side, close—almost pressed—together, making a pretty effect, like a splotch on a painter's palette, but in feather-work—very much softer.

Whilst jotting this down a minute spider falls on my note-book. This answers the question as to the Golden-crested Wrens, "What can they get?"—to a certain extent, at least. Many spiders seem to hybernate in the chinks of, and especially underneath, bark in winter, some of them in a sort of webby cocoon which they spin. Numbers of small pupæ, too, choose—or have in their pre-existence chosen—the same situations, and especially that extremely common one, about here, of the Cinnabar Moth. Its luridly-coloured caterpillar, banded with deep black and yellow, is all over the common fleabane, that grows something like a scanty crop over much of the sandy soil hereabouts, and when about to pupate, as I have noticed with interest, it ascends the trunk of the Scotch fir, and undergoes the change in one of the numerous chinks of its flaky bark. I have seen numbers of them thus ascending and entering, but I do not know from how great a distance they come to the trees. Probably it is only from quite near, for the majority, to get to them, would have to travel farther than can be supposed possible, and, moreover, fir-trees in these parts date only from some fifty years ago, I believe, if so far back as that. Doubtless it is mere chance, but when one sees them crawling towards the trees, and ascending as soon as they get to them, it looks as though they were acting under some special impulse. These caterpillars are, I believe, nauseous to birds. I have thrown them to fowls, who appeared not to see them. This, I suppose, is an example of warning coloration.

December 10*th.*—Of all birds, Moorhens seem to me to utter the most extraordinary sounds. They have purrs, mews, explosions, and so forth, all of them having a certain brazen resonancy which suggests more a metal instrument than anything made of flesh and blood. Transliteration is wholly impossible, yet what say you to "chook-oo, chook-oo," followed by a long-drawn guttural note, something like—if it could be like anything —"ger-oorrrrr," or to a sudden "currew-oo," with an indescribable resonant, burring trill in it?

"Que pensez-vous de ça mon chien?
Que pensez-vous de ça mon chat?"

December 11*th* (cold frosty morning, but bright and fine. Light snow on the ground).—At 8.50 a.m. I was by the streamlet, at that part of it which I call the creek, behind and well concealed by the willow, as yesterday, but in a more comfortable position. As I got there I heard quite close, amongst the sedge, a peculiar, almost squeaking, note, quite different to that of the Moorhen.

It had a high needley sound, and was rapidly repeated, each individual note being short and of one syllable. Almost immediately two Dabchicks swam out into the stream, and one of them uttered a note, not, indeed, the same as I had just heard, but having the same character of sound. It was a sort of weak chirruppy chatter, rather than a squeak; but shortly afterwards I hear the same little needley squeaking, and now again a "wee-ee-ee-ee-ee-ee-ee" very rapidly repeated, and with a thin vibration. It is a curious note, different from that of any other bird I know of. If a tittering young lady were to be changed—or modified—into a Grasshopper, but beg, as a favour, to be allowed still to titter—*as* a Grasshopper—this would be it. It is also like—indeed, very like—the hinney of a Horse, heard in the farthest distance at which the ear can still catch it—immense improvements both on the imagined original. The Dabchick's note is given, in a well-known handbook, as "whit, whit"; so, as this is not a whit like what it appears to me to be, I shall continue to jot it down when I hear it, more particularly when I happen to see the bird at the same time. At nine it commences to snow.

In the woods at Jerry's Hill, where the Rooks roost, at 3 p.m. The actual spot is a square plantation of gloomy firs, but skirting this is another one of young oaks and beeches, from which, on my approach, Wood-Pigeons in great numbers fly up. After I have been for some time silently seated under a tree of the dividing row—between the two plantations, that is—they return "in numbers numberless," almost rivalling the Rooks themselves. They cut the air at a great rate, making a whistling, whirring noise, and descend impetuously, into the oaks especially, which are more numerous than the beeches. They like to be near one another, so that, though their numbers are so great, and being continually reinforced, they seem, rather, gathered into a few trees that are close together than scattered amongst them generally; no doubt they are this, too, though more thinly. I cannot see all of the plantation equally well, but it seems as if some trees are favourites, into which all the birds that can, descend.

In about twenty minutes, during all which time the plantation has been filling, a number of the Pigeons fly out from the most populous trees into others farther off, as if the ones they were sitting in had become overcrowded. There is a constantly recurring clatter and swish of wings, and then, in another ten minutes, the great bulk of the birds (as it seems) rise suddenly, with such a clapping as Garrick or Mrs. Siddons might have dreamed of, fly rapidly about, descend into the trees again, leave them once more, and depart—numbers of them, at least—in impetuous, arrowy flight. In a little while, though the plantation seems still fairly peopled, the greater part of them, as I think, have gone. Towards four, however, it becomes so cold that I have to move, and *all* the Pigeons fly out of all the trees—a revelation as to their real numbers, quite a wonderful thing to see. Some of the trees, as the birds leave them—just in the moment when they are going, but still there—are neither oaks, nor beeches (nor ashes, elms, poplars, firs, sycamores, nor anything, for the matter of that) but *pigeon*-trees—that and nothing else. A wonderful sight! A wonderful thing! Something in England, after all!

December 12*th.* (Hard weather. Slight snow on the ground.)—I was up before four this morning, and got to the woods where the Rooks roost at 6.20, an hour almost before they even began to fly out. Whilst cycling down I saw a splendid meteorite, or leonide, as they call them now. I did not merely happen to see it, as it was falling, but my attention was attracted by a sudden lighting up of the atmosphere, causing me to look about, when I saw a great luminous green globe, in appearance as large as a football, descending through the sky to my right. It was of a light luminous green, brilliant, but softly brilliant—very distinctive. I can think of no colour like it—earth is not like unto heaven.

The Pheasant's habit of crouching favours, I think, the view that the brilliant colouring of the male bird has been acquired gradually. See this one now, in this little scanty plantation of stunted oak and hazel-bush, thus trying to elude observation. It is as though a torch should do the same. The bright burnished surface of iridescent hues, the intense red round the eye, are almost as conspicuous amidst the cold wintry surroundings—the leafless trees with the deep glow of sunset beyond, against which they stand like ink. But the hen Pheasant, from the plain stuff of whose plumage the cock's gorgeous tapestry has been evolved, would be well-nigh invisible were she now in his place. However, stillness is, in itself, less conspicuous than motion. After all, there is nothing like not being seen, and foliage, as well as mere luck, may secure this advantage to the most resplendent. One cannot see all ways at once. But I believe that your thorough-going advocate of protective coloration would look at a red lion, stepped off a public-house, and cry out, "How assimilative!"

There is one thing that my attention has been drawn to in regard to the male Pheasant. It has upon the posterior portion of the back a large patch of much less brilliant colouring than the rest of it, or than the throat, neck, head, &c. When the bird is in retreat—and it often retreats stealthily for some while before crouching—this surface is turned towards one, and I have thought, sometimes, that here was a sort of dull-coloured shield to the bird's brightness—it does, I think, act as such to some extent. I look upon it, however, as that part of the body which is least exposed, during courtship, to the observation of the hen, and which has therefore remained comparatively dull.

A Robin is searching the newly flung-up mould of a Mole-heap, and seems to find something, which he flies away with. Looking closely at some similar mould afterwards, I can find nothing whatever that a bird might eat. It is difficult to think what birds do find on days like this. Squirrels have their hoards, yet who would think to see them scampering over the snow in the depth of winter? What make they out of their warm hibernacula, where—happy beings—they may sleep away not nights only, but weeks, months, a whole season at a time? That is what they are supposed to do—at least, I understand so. True they lay up stores, and on a warm sunny day one can understand them coming out to go to them. But why on such a day as this? Has the weather really nothing to do with it, but do they wake up, at certain intervals, hungry? But why then should they hybernate at all? There must be food enough for them surely. Fir-cones are quite a staple of their diet, and these are on the trees through the winter. Then, again, they eat bark, if all tales be true, though the bark made about it is worse, I suspect, than their bite. Hybernation seems a splendid remedy for a want of food, and that I have looked on as the *rationale* of it. But surely, if a Hare or Rabbit can get through the winter without hybernating, a Squirrel ought to be able to.

(To be continued.)

BIONOMICAL NOTES ON SOME BORNEAN MANTIDÆ.

By R. Shelford, M.A., C.M.Z.S., Curator of the Sarawak Museum.

During a five years' residence in Sarawak, Borneo, I have kept in captivity, and under close observation, many species and specimens of *Mantidæ*, and have from time to time jotted down rough notes on their habits, their food, methods of feeding, life-history, &c. The following account is a brief *résumé* of these notes, and, though containing no very important or new facts, may perhaps be of some interest to those readers of 'The Zoologist' who have never had the good fortune to observe these curious insects alive for themselves.

Species of the genus *Hierodula* and *Tenodera superstitiosa* are met with more frequently than any others in Borneo, and, as they are strongly attracted by light and frequently fly into houses at night when the lamps are lit, I have had plenty of opportunities of observing their habits in captivity, and of checking my observations.

A Mantis such as one of these, when first captured, displays considerable ferocity, grasping with its raptorial legs the fingers of its captor with great force, at the same time trying to bite, but after a few days many become comparatively tame, and some of my captives would not only take food from my fingers, but would devour it whilst resting on my hand. It is most interesting to watch a Mantis, e. g. *Hierodula dyaka* (a bright green species), attack a large butterfly, such as an Ornithoptera or Amathusiine when introduced into its cage; the movements of the butterfly are watched closely for some time, the Mantis turning its head from side to side in what appears to be a very intelligent manner; the fore part of the body (the prothorax) is raised, the raptorial front legs are drawn up close against the side of the body, and their yellow inner surfaces turned outwards; the abdomen is sometimes so strongly dilated as to show the black intersegmental membranes. The butterfly is seized with a sudden snatch, and the Mantis nearly always commences operations by biting through the costal nervures of the fore wings near their origin; if, however, the prey has not been seized in a position favourable for this method of attack, the Mantis bites into the chest so as to sever the wing-muscles. A large Ornithoptera, when first seized, will dash its attacker with great violence against the sides of the cage in its mad struggles for freedom, but I have never yet seen a Mantis relax its hold; on the contrary, it will with much persistence literally burrow its way into the thorax of the butterfly until the flutterings become weaker and weaker, as one by one the wing-muscles are severed. If the butterfly is one of the weak *Satyrinæ* or a small Nymphaline, the Mantis commences its meal on any part that comes handy—the head, the abdomen, or perhaps the legs; but strong-flying species are always attacked, so far as my observations go, in the way described, and as often as I have witnessed it, I have been irre-

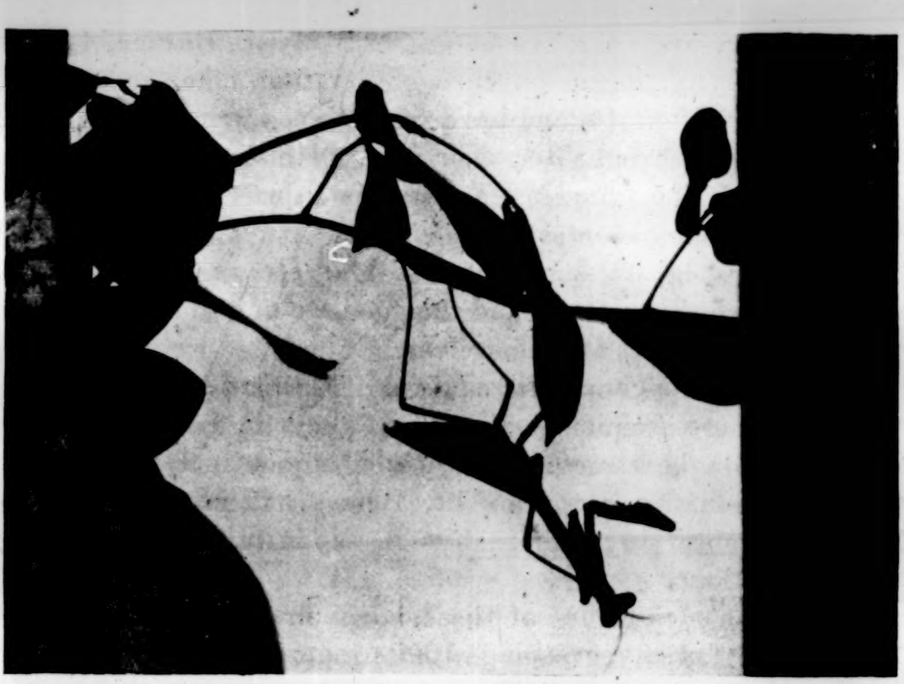

Fig. 1.—*Rhombodera basalis*, De Haan; cleaning its left mid-leg after a meal.

sistibly reminded of a bull-dog trying to pull down a bull. If the Mantis is hungry it will devour the whole butterfly, leaving only the wings, and perhaps the distal part of the legs. After a meal a Mantis will proceed to clean itself; the teeth of the fore femora and tibiæ are picked over by the mandibles, then the fore legs are repeatedly rubbed over the eyes and top of the head, much in the same way as the House-fly, after rubbing its fore tarsi together, passes its legs over its head; finally the tarsi of the middle pair of legs are cleaned in the following way: the prothorax is turned at an angle to the rest of the body, and one of the front legs hooks up one of the middle legs and carries it to the mouth; it is held in position there whilst being cleaned by the mandibles, and then released (Fig. 1). A great many *Mantidæ* have, as is well known, the inner sides of the fore legs coloured in a conspicuous manner, and these conspicuous markings are displayed whenever the insect is meditating an attack on its prey. The green *Hierodulæ*, however, have the inner side of the fore legs merely a pale yellow, which is certainly not very conspicuous; still, as already stated, a Hierodula, when a butterfly is introduced into its cage, always throws itself into an attitude that displays these yellow surfaces to best advantage, not, so far as I can see, to terrorize or fascinate its prey, but merely because a sudden and powerful snatch is more readily made from this position than from any other. I am inclined to believe that in such an unconscious "display"* as this we may see the beginnings of those remarkable attitudes assumed by such floral simulations as the Empusides, which attitudes might well be termed "purposeful displays."† Of course, many species, e. g. *Tenodera superstitiosa*, do not attitudinize in any way whatever when excited, and that I am inclined to regard as the primitive habit; but these species have not got the fore legs coloured on the inside even as conspicuously as the *Hierodulæ*. The dead-leaf-like form (*Deroplatys desiccata*) has the inner side of the fore femora red-brown, blotched with black and pearly white in a small oval patch on the front border. In another dead-leaf-like species (*D. shelfordi*) the inside of the fore coxa is red throughout its proximal two-thirds, pale bluish in the distal third, the femur has a heavy black blotch about its middle. *D. desiccata*, preparatory to seizing its prey, invariably behaved like the *Hierodula*, i. e. the front of the body was raised, and the fore legs drawn up close against the body, and slightly rotated outwards so as to display their inner surfaces. The black and white blotches show up very conspicuously against the red-brown of the rest of the body. The under sides of the elytra in this species are marked on their outer halves with conspicuous white and madder blotches, but these markings are never displayed. *D. shelfordi* used to adopt a very different attitude when prey approached; the front of the body would be raised and the fore legs stretched out widely at right angles on either side of the body; sometimes the elytra would be raised up, and the wings spread out fan-wise behind them,* the Mantis all the time this attitude was maintained swaying slightly from side to side. The under sides of the elytra in this species are bluish grey, with four large fuscous patches, the wings on the costal border are pale yellowish, but otherwise are coal-black mottled with innumerable fine pinkish-white lines.

---

* By the term "display" I mean the sudden exhibition of brightly coloured or conspicuously marked parts which are concealed during rest.

† I find that I am anticipated in this supposition, for Dr. Sharp, in an interesting paper on *Idolum diabroticum* (Proc. Cambridge Phil. Soc. vol. x. pt. iii.), supposes (p. 180) that "in the past the function of catching in a particular manner has preceded the modifications of structure for doing so."

A still more remarkable appearance is presented by *Hestiasula sarawaca*. This little Mantis, when at rest, is very cryptically coloured with brown and grey; its fore femora are produced into large flat expansions, which causes them to be disc-like in shape; they are held close together in front of the body, when the insect appears to be of roughly the same diameter throughout, and looks like a piece of wood or excrescence of bark. On the approach of prey, or when irritated, a wonderful transformation takes place; the prothorax is raised, and the fore legs are spread widely out on either side of it; the elytra, wings, and abdomen are also elevated, the wings spread out fan-wise; the front coxæ on their inner aspect are a deep crimson; the plate-like femora are bright yellow, with a black sickle-shaped marking extending along the posterior and proximal borders, and with two small black spots on the anterior border; the under surface of the prothorax is coal-black, and the wings are black, mottled nearly all over with fine chrome-yellow streaks and dashes. During this "display" the antennæ are agitated so rapidly that only an indistinct blur is seen in their place; the fore tibiæ snap down on their femora with a clock-like regularity, a continuous rustling sound maintained by the wings, and the insect sways from side to side, now bolt upright, then right over on one side, then with a swing right over on the other side.

---

* A large species of *Gryllacris*, common in Indo-Malaya, when irritated, always raises the elytra and wings fan-wise over the back. The European *Mantis religiosa* "displays" in the same way.

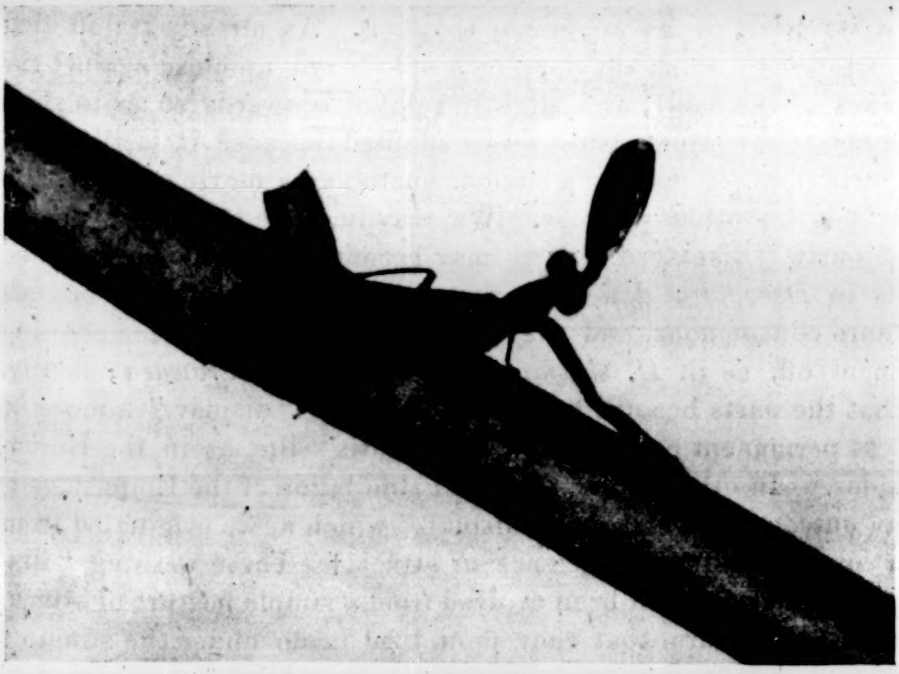

FIG. 2.—*Hestiasula sarawaca*, Westw.; beginning to "display:" front of body raised, fore-legs opening out.

A green and white *Theopropus* (*T. elegans*, Westw.) "displays" in much the same manner as *Deroplatys shelfordi*, but neither the inner side of the fore limbs nor the wings are conspicuously coloured.

What is the meaning of these "displays"? It should in the first place be remembered that they can be induced by irritating the Mantis, as well as by the presence of prey. None of the species described above look in the least degree flower-like when "displaying," and it is absurd to suppose that butterflies or other insects can be fascinated or attracted by conspicuous markings or weird postures. I can only conclude that these Mantid "displays" are warning attitudes comparable with the warning "displays" of many lepidopterous larvæ (*cf.* the eye-spots of many species of *Chærocampa* amongst the hawk-moths, the black patch in larvæ of *Dasychira* spp. amongst the *Lymantriidæ*, the everted red processes of *Papilio* larvæ, &c.).

Further, I believe that these "displays" have originated from the simple posture of attack or defence into which such a species as *Hierodula dyaka* throws itself when stimulated by the presence of its prey, or by an enemy's attack. As already stated, that posture—in which the fore legs are drawn up close against the sides of the body, and slightly rotated outwards so as to show their yellow inner aspects—is adopted because it is the most convenient for making a sudden snatch at a moving insect, and it has no other purpose. We may imagine that these unconsciously "displayed" parts may become conspicuously marked as in *Deroplatys desiccata*, that still later these parts become more conspicuous, and the attitude better adapted for showing them off, as in *D. shelfordi* and *Hestiasula sarawaca;* finally, that the parts become flower-like, and the "display" a more or less permanent condition in the Mantis's life, as in the Empusides.[*] In other words, the floral simulation of the Empusides is an outcome of a warning "display," which again originated from a simple posture of defence or attack.[†] These warning "displays," having then been evolved from a simple posture of attack, it is only natural that they should be made under the stimulus of any excitement, such as the presence of prey or an enemy. A Mantis is naturally a ferocious insect, and its first instinct when stimulated is to seize and destroy the exciting cause; for example, none of the dead-leaf-like species feign death when irritated, as Phasmids and many other cryptically formed insects do, but instantly prepare to attack their assailant.

---

[*] The Empusides are described by many observers as swaying gently when at rest, apparently to imitate the swaying of a flower in a gentle breeze. This swaying movement is, as shown above, characteristic of the warning display of *Hestiasula sarawaca.*

[†] Dr. Sharp (*l. c.* p. 177) thinks that the position in which the front legs of *Idolum diabolicum* is held is very unusual amongst the *Mantidæ*, but I hope that I have shown that this is not the case.

A very curious and interesting species is *Metallyticus semiæneus;* it is a metallic-green and blue-black, is much flattened dorso-ventrally, and has many other uncommon characteristics; unlike all other *Mantidæ* with which I am acquainted, it runs with great swiftness, and with the gait of a cockroach, *i. e.* literally *ventre à terre*, the body not being raised well off the ground as is the case with its relations. The species is found generally on the bark of trees, but often underneath the bark, and it preys on cockroaches. I endeavoured, with ill-success, to keep specimens of this Mantis in captivity before I discovered that its natural prey was cockroaches; butterflies, flies, termites were never touched, but if a cockroach was introduced into a cage containing this Mantid, it was either pounced on at once or else captured after a long and exciting chase all over the cage.

Theopropus elegans has the curious habit of resting on the femoro-coxal joints of all the legs; it progresses with a curious swaying top-heavy motion, varied with an occasional scrambling leap; the large fore legs of this species appear as if too heavy for it. The hind wings are a beautiful iridescent white, very finely speckled with purple.

Hymenopus bicornis, one of the Harpagides, is a floral simulator throughout the whole of its life-history, with the exception of the first stage. I shall have some remarks to make on the young of this species later on. The adult is a cream-colour, with some brown stains on the elytra; the mid and hind femora are furnished with plate-like expansions, the prothorax is only slightly enlarged, and the fore legs not at all. In the cabinet the insect does not look very flower-like, but when seen hanging perhaps upside down on a bush with the two pairs of ambulatory legs spread wide out, it can readily be mistaken for some curious orchid-like bloom. It makes no "display" on the approach of prey, but quietly waits till that comes within striking distance, an exceptional habit induced doubtless by its floral simulation.

Some *Mantidæ* are much afflicted with a parasitic worm, a long brown thread-like Gordian; the two species that I have found to be most affected are *Hierodula dyaka* and *Rhombodera basalis;* it is, indeed, very seldom that one of the latter is found without its parasite, which lodges in the fat body above the intestine. Professor Camerano has described this Gordian worm as *Chordodes shipleyi* (Atti della R. Accad. delle Scienze di Torino, vol. xxxiv. p. 3, 1899).

One of my objects in keeping *Mantidæ* alive was to test their likes or dislikes for particular insects, and their appreciation of the warning colours displayed by distasteful insects,* and with this object in view my captives have always been furnished with a most mixed diet. I may say at once that I have found little evidence that *Mantidæ* appreciate warning colours, and still less evidence that they prefer one sort of butterfly to another, or particularly dislike such acknowledged distasteful butterflies as the members of the subfamily *Danainæ*. The black and white day-flying moths of the *Deilemera* (=*Nyctemera*) are, however, invariably refused, and left strictly alone, even when introduced together with cryptical moths and butterflies that are presumably palatable. I have never yet seen a Mantis attack one of these distasteful species, nor have I ever found their half-eaten remains in a Mantis's cage. In this connection it is interesting to note that the large and common Spider (*Nephila maculata*) manifests the same dislike for *Deilemeræ*. I spent several hours one morning introducing insects of the most varied orders into a web of this Spider. All butterflies and many beetles were devoured greedily, but *Deilemera coleta*, and another species of the same genus, the little Bees of the genus *Trigona*, and the Reduviid bug (*Velinus nigrigenu*) were always cut free and flicked out of the web at once. I have several records of *Mantidæ* seizing and partially devouring such *Danainæ* as *Parantica eryx*, *Trepsichrois mulciber*, *Tronga crameri*, and then relinquishing their hold as if their meal was too nauseous to be proceeded with; but these rejected insects have always been dead when relinquished, so that their warning colours were of no value to them in securing them immunity from attack. My records of *Mantidæ* seizing and completely devouring *Danainæ* are, on the other hand, much more numerous, and I have not even had reason to suspect that a prolonged diet of Danaine butterflies has been prejudicial to the health of any Mantis, though Mr. Marshall (*l. c.* p. 309) believes that in some cases a prolonged *Acræa* diet was the cause of the death of some of his captive *Mantidæ*. It is quite possible that the gaudy Acræas are more nauseous than the Oriental Danaines; *Limnas chrysippus* and other species of the same genus are found so rarely in this part of Borneo that I have not been able to experiment with them, which is a matter for some regret, as these are the most gaudy members of the *Danainæ*. I have also tried the experiment of putting several species of butterflies—palatable and distasteful species—into a Mantid's cage all at the same time, and watching to see if any selection was exercised; but, with the aforesaid exception of *Deilemeræ*, the Mantid always appeared perfectly indifferent in its choice, a Danaine being seized as eagerly as any other species if it happened to get within striking distance. A newly captured Mantis will seize and devour any fluttering insect that may be introduced into its cage, purely, I believe, from sheer ferocity, and I think that in all experiments of this nature this fact ought to be taken into account; for example, I have seen a newly-imprisoned Mantis pounce on a male *Trepsichrois mulciber*, and, after nibbling at its head and legs, suddenly nip off the yellow scent-glands which were protruding from the end of the abdomen of the butterfly; the butterfly was then released, recaptured, released again, recaptured again, and finally devoured. Two very strong-smelling Coreid bugs, *Mictis longicornis*, were introduced into a cage containing a species of *Hierodula*, and much to my surprise were completely devoured. It is recorded in Mr. Marshall's paper, that two bugs, *Cyclopelta* sp. and *Physomerus* sp., were never eaten, though often killed, by an Indian Mantis, *Hierodula bipapilla;* on the other hand, that the Coreid *Anoplocnemis curvipes* * was devoured by Baboons.† On the whole, allowing for the assumed greater distastefulness of *Acræinæ*, my results agree well with Mr. Marshall's: we have little or no evidence that *Mantidæ* appreciate warning colours; a distasteful insect when seized is either completely devoured or else half eaten and so killed, and neither here nor in Africa do *Mantidæ* show that aversion to distasteful forms that one might expect, nor do they exercise much, if any, selection in the capture of their prey from amongst a number of butterflies.

---

* See Trans. Ent. Soc. London, 1902, pt. iii. p. 297 *et seq.* for a series of experiments on Mantid likes and dislikes, by G. A. K. Marshall ("Bionomics of South African Insects").

---

* The *Coreidæ* are rather a puzzle to supporters of the mimicry theory; they all have a very strong and disagreeable odour, just as the brilliantly coloured *Pentatomidæ* have (cf. *Catacanthus*, *Chrysocoris*, &c.), and yet all are cryptically coloured, and many have the leaf-like expansions on legs and prothorax which we are accustomed to associate with palatable cryptically coloured insects, such as Phasmids and some beetles.

† Another species, *Holopterna alata*, in spite of its offensive smell, is eaten in the Transvaal by a Lizard, Fowls, and Meerkat.—Ed. (*Cf.* 'Zool.,' 1902, p. 393.)

I have been able to recognize two types of egg-cases amongst the *Mantidæ* of Borneo: (1) that made by the members of the tribe Mantides; (2) that made by the Harpagides. The former is a large rounded white structure adhering to vertical grass-blades or plant-stems. It consists of two distinct parts—an outer thick covering of spongy texture, being a dried froth, and a dense central mass of eggs disposed symmetrically in closely apposed follicles; the outside is streaked slightly, showing that the outer covering was laid on in successive layers of froth. Such an egg-case is figured in almost every entomological text-book. I believe that the use of the spongy outer covering is to prevent the attacks of parasitic Hymenoptera. An Ichneumon fly would require a very long ovipositor to reach the central mass of eggs; yet such are to be found frequently in Borneo, and on one occasion I disturbed a small Braconid (? *Iphiaulax* sp.) that was resting on a Mantid's egg-case. I reared young Mantid larvæ from these eggs; so either the Braconid had not commenced operations when disturbed, or else had no nefarious designs on the nest at all. Very frequently an egg-case is tenanted by ants, who scoop out much of the outer covering, leaving a mere shell with the central egg-mass attached by a few strands only to the outermost wall; the ants never seem to interfere with the eggs. The Harpagides make a long narrow egg-case, generally cream-coloured, and adhering to more or less horizontal stems and twigs. The eggs are disposed symmetrically along a central axis, and covered with a very thin layer of froth, smooth and shining on the outside. *Theopropus elegans* and *Hymenopus bicornis* are devoted mothers; a captive specimen of the former used always to rest astride her egg-case, and twice I have taken the latter close beside her eggs.

Hestiasula sarawaca makes a nest more or less intermediate between the Mantid and Harpagid types, *i. e.* it is a long narrow structure adhering to a horizontal twig, but it is covered with an irregularly shaped mass of dried froth, not smooth on the outside, sea-green in colour. The young of Harpagides walk straight out of the ootheca on to the twig to which it adheres; but the young of the Mantides lower themselves from the suspended nest by silken threads to the ground, or to a leaf, and only then begin to rid themselves of the embryonic envelope in which they are encased (see a figure in 'Cambridge Natural History—Insects,' Part I. p. 247).*

The young of *Hierodulæ* are green or yellowish, and quite recognizable as the offspring of their parents. But this is not often the case, *e. g.* the young of *Tenodera superstitiosa*, a brownish-green species, are coal-black, except on the crown of the head, dorsal surfaces of the meso- and metathorax, and the legs, which are salmon-pink; the lateral borders of the prothorax and abdomen are pearly-white; the eyes are pearly-white, with a black streak running down the centre; the four basal joints of the antennæ each bear four long setæ and look feather-like. These little creatures are very active, and look remarkably like ants.

The young of *Metallyticus semiæneus* are chequered on the meso- and meta-notum and on the dorsal surface of the abdomen with white, and the legs are red. Unlike all the other larvæ and pupæ of *Mantidæ* that I am acquainted with, this does not carry the abdomen turned up over the back of the thorax. The newly-hatched young of *Hymenopus bicornis*, when they just emerge from the ootheca, are sealing-wax red, with black head and legs; they then bear a remarkably close resemblance to the young larvæ of a Reduviid Bug, *Eulyes amœna*, even to their method of moving about with abdomen turned up. In this stage the plate-like expansions of the legs are not developed. After the first moult the larvæ become pink or cream-colour, and the femoral expansions make their appearance; from this stage on the insect remains flower-like. The colour of the larva depends a good deal, if not entirely, on the colour of the flowers that it frequents. Recently I had brought to my notice a specimen that had been found on a yellow flower with crimson stamens; the larva was yellow, with crimson lines on the abdomen and crimson mid- and hind-axæ. As far as my observations go, this species cannot change its colour in adaptation to its surroundings without moulting. A pink specimen found on a shrub with pink flowers (? *Melastoma* sp.) was kept under a bell-jar standing on a sheet of white paper. After a few days the larva moulted, and was then pure white. A nymph of *Deroplatys desiccata*, on the other hand, that was kept for some days in a box lined with white paper, became noticeably paler in colour.

---

* I have not come across any pre-larval stage such as has been described for the European *Mantis religiosa*.

A full and accurate account of the habits of a pupal *Hymenopus bicornis* may be found in a paper on the Insects of the Skeat Expedition, by Mr. Nelson Annandale (P. Z. S., pt. iv. 1900, pp. 839–848). The same paper contains notes on other Malayan *Mantidæ*.

Description of a New Species of Mantidæ referred to in the above paper by W. F. Kirby, F.L.S., &c.

DEROPLATYS SHELFORDI, sp. n.

Long. corp. 60 millim.; long. pron. 30 millim.; lat. 26 millim.

Female.—Dead-leaf brown; pronotum of a long bell-shape, regularly curved and expanded backwards to its greatest breadth, the hind border curving backwards and inwards to the extremity; lateral borders denticulated on the basal half. Tegmina with no distinct markings except a narrow yellowish discal stripe; wings banded with blackish, and produced into long processes at the extremity, as in *D. truncata*, Guér. Spines of the front femora and tibiæ more or less tipped with black; front femora with a black band towards the extremity on the inner side, intersected by two or three short yellowish stripes; front coxæ with six or eight short straight spines.

Hab. Borneo; Sarawak (Shelford).

Apparently intermediate between *D. truncata*, Guér., and *D. horrifica*, Westw., resembling the former in shape, and the latter in markings.

BIRD NOTES IN SARK, 1903.

By E. F. M. Elms.

(Concluded from p. 263.)

Red-backed Shrike (*Lanius collurio*).—Saw several individuals. They were mostly very clamorous, and were constantly uttering their "chirruping song, not unlike the attempted singing of a Sparrow in sound."

Swallow (*Hirundo rustica*).—A good many about hawking for insects either inland or near the sea. Saw no nests, though several open sheds were inspected. They probably breed in suitable places among the sea-cliffs.

House-Martin (*Chelidon urbica*).—Less common than last. Nowhere were there any of their familiar plastered nests under the eaves of the houses. Perhaps they, too, breed among the cliffs.

Greenfinch (*Ligurinus chloris*).—Not an abundant species, but occurring in localities suitable to it.

House-Sparrow (*Passer domesticus*).—As ubiquitous in Sark as elsewhere, and nesting in trees.

Chaffinch (*Fringilla cœlebs*).—The remarks made on Greenfinch apply here.

Linnet (*Linota cannabina*).—Considering the vast quantities of gorse, one might have expected to find Linnets in hosts; not so, however, but they were fairly numerous, especially on the western coast, and nesting freely in the gorse.

Corn-Bunting (*Emberiza miliaria*).—One or two noted on cultivated land, but by no means common.

Yellow Bunting (*E. citrinella*).—Saw only one of these handsome birds during the whole of our stay.

Cirl-Bunting (*E. cirlus*).—Same as Yellow Bunting.

Starling (*Sturnus vulgaris*).—Quite an uncommon species, comparatively speaking. Heard young ones crying from a hole in the cliffs, to which the parent flew with food in its beak.

Chough (*Pyrrhocorax graculus*).—Did not see one personally, but I hear it still hangs on, but in ever-decreasing numbers.

Magpie (*Pica rustica*).—One of the commonest of the Corvine family, all keeping inland, and seemingly not so shy as in England, feeding out in the open fields, or at the side of the road.

Carrion-Crow (*Corvus corone*).—Perhaps as common as the Magpie. Saw several every day, generally in the locality of the sea. The Crows and Sea-birds are sworn enemies, and a fearful uproar ensued one day as one of these black rascals alighted on one of Les Autelets (comprising four isolated rocks), the inaccessible home of Guillemots, Gulls, &c. On another occasion saw hostilities between a Crow and an Oystercatcher, and at all times, when near the Gulls' nesting haunts, found many broken eggs lying about, the work of the Carrion-Crow, no doubt.

Rook (*C. frugilegus*).—I have nothing in my notes about this bird, but do not remember seeing one, and certainly there is no rookery. Perhaps it is not altogether surprising, as there is only about one place on the whole island suitable for their nursery.

Raven (*C. corax*).—Two specimens only came under my notice.

Sky-Lark (*Alauda arvensis*).—Common. Keeping preferably to the more cultivated parts.

Swift (*Cypselus apus*). — Nearly as frequently met with as the Swallow. They, in common with the Swallows, seemed more abundant on the western coast, and this was probably due to the fact that during the greater part of our stay there was a north-easter blowing, and the western side was more protected and warmer. This bird probably breeds in suitable crannies in the cliff-face.

Cuckoo (*Cuculus canorus*).—I have never seen more in one particular area. At the northern part of the island they were more commonly met with than anywhere, excepting perhaps Little Sark. They delighted in perching on the rocks strewn about above Les Boutiques caves, and sung the familiar song therefrom. On two or three occasions I heard the song rendered "cuckoo, cuckoo," and ending abruptly with "cuc," and also the other variation of "cuc-cuckoo." It is matter of some surprise that with so many Cuckoos in the district, and the amount of nests found, that not one contained a Cuckoo's egg.

Kestrel (*Falco tinnunculus*). — The only representative of the Raptorial birds, seen hovering over a field of young corn just before sundown on the evening of May 24th.

Stone Curlew (*Œdicnemus scolopax*).—Met with none of them, but was told by the fishermen that they were acquainted with it, and that it sometimes bred on the island.

Golden Plover (*Charadrius pluvialis*). — None in Sark in May, having migrated north to breed, but they are seen in countless hosts in early spring, probably when performing their migrations.

Lapwing (*Vanellus vulgaris*).—Same as last. I believe a great many more species of this order are to be observed in winter.

Curlew (*Numenius arquata*).—On May 23rd saw two of these birds on the rocky headland near Les Boutiques, at the northern end of Sark, and a few days later my friend saw a solitary bird in the same spot. At first I presumed that they would be non-breeding birds, having no occasion to go north, but one of our boatmen says that they do breed in small numbers on the Herm, an island between Sark and Guernsey, and that there are more about in the winter months.

Cormorant (*Phalacrocorax carbo*).—Nesting in considerable numbers at various points along the coast, generally in a small niche in the perpendicular sides of the cliffs, and wholly inaccessible. One nest on L'Etac de Sark was empty, and this remark applies to another on the Grande Moie, from which the bird flew off. The fishermen hate the Cormorant, in common with the Guillemots and Razorbills, which, as they say, fly through the water as fast as through the air, and frighten what fish they do not devour. They are strict with their little laws in Sark, and bird protection takes the form of a fine of £5 for every egg or bird taken in the close season; but in spite of this the men are only too glad to shoot through the Cormorants' nests at breeding time whenever the opportunity presents itself. The Cormorants' chief breeding stations around the Sark coast are at L'Etac, probably on Brecqhou—the largest dependency, but did not land there—at Moie de Mouton, on Les Autelets, and Grande Moie. Of these, all except Moie de Mouton are isolated rocks, and the Moie de Mouton can only be reached in safety by boat. At Les Autelets there is one curious flat rock slightly inclined, on which the Cormorants love to sit and "hang themselves out to dry," and which is completely whitewashed with their excrement. This rock is much like a large altar, from which the group get the name of Les Autelets.

Shag (*P. graculus*).—In less numbers than the last named, and breeding in the vicinity of Les Autelets, but impossible to reach their nests.

Gannet (*Sula bassana*).—Met with none of these magnificent birds in Sark, but I hear they are to be found earlier in the year. Saw two, however, about mid-channel between Guernsey and Weymouth.

Common Tern (*Sterna fluviatilis*).—Only a few individuals had arrived by May 29th, the majority putting in an appearance during the first week in June. On the Moie de la Bretagne, where we lunched, a nest was found containing one egg. Within a few days our boatmen said there would be as many as two hundred of them frequenting this tumbled mass of rocks, which lies off the western coast of Little Sark.

Oystercatcher (*Hæmatopus ostralegus*). — A fairly common and always pretty shore-bird in Sark, and breeding on the lower lying rocks of L'Etac; also on Moie de la Bretagne, where I found a nest containing two eggs. The fragments of a third were lying some few yards away, probably having been pilfered by Crows. This bird also breeds on Grande and Petite Moies, but found no nests there.

Kittiwake (*Rissa tridactyla*).—Breeding in considerable numbers at the Moie de Mouton wherever a suitable ledge in the perpendicular cliff permitted. In all cases their nests were totally inaccessible.

Herring-Gull (*Larus argentatus*).—The commonest of all the Gulls, breeding in incredible numbers at a great many gulleries all around the coast, but in no case was it possible to approach the nests from the land, and none too easy from a boat. Examined some thirty nests at the various points touched at during our trip round Sark in a small boat. All of them were large, *i. e.* with wide diameters, but otherwise slight structures of dead grass and other withered herbage and seaweed, and placed in a hollow among the rocks, or in thick grass growing up the cliffs. Of all the nests I saw only one had more than two eggs, and that was a Lesser Black-back Herring-Gull's nest, containing one egg of the former bird and two of the latter. This seems rather curious, as the clutches are usually given as three, and that laying, generally speaking, was finished, I am perfectly sure, as the parents had all begun incubation, and some of the eggs I procured contained an embryo in a slightly advanced stage of incubation. At very low tide, when an expanse of sand is laid bare, the Herring-Gull is very fond of probing about for Sand-eels, and as I learn the Herring is never caught in these seas, the name gained from its habit in following shoals of Herrings becomes a misnomer.

Lesser Black-backed Gull (*L. fuscus*).—Breeding in numbers, but is not so common a species as the last named. There seems a strong social instinct between these birds and the Herring-Gull, nesting near one another, and even in the same nest, as already noted. The nests of the two species are to all intents and purposes identical both in position and materials, and the eggs themselves are not easy to authenticate. One boatman says you can always tell, because the egg of the Lesser Black-back is darker in colour, *i.e.* the background is browner in this bird and greener in the Herring-Gull, and that in the former the blotchings assume a deeper intensity of colour as to be almost black in some cases, whereas in the Herring-Gull the markings never get to a much deeper shade than deep umber-brown. I am inclined to think he was not altogether wrong either, for some eggs I knew to be Lesser Black-backs were much darker than the Herring-Gull's, and two—one of each species—taken from the same nest, are quite dissimilar, one being dark, and the other—the Herring-Gull's—lighter. But some of the eggs obtained were intermediate in colouring between dark and light, and might equally well belong to either species.

Great Black-backed Gull (*L. marinus*).—Saw two of these noble birds on an isolated rock off the Courbée du Nez, at the northern end of the island. I am not able to say whether or not they breed hereabouts.

Stormy Petrel (*Procellaria pelagica*).—When on the Petite Moie, I most distinctly detected the musky odour that is always present near this bird's breeding haunt, and I have little doubt that a nesting bird was within a few feet hidden away in some secret crevice in the rocks. Our boatmen, too, noticed it, and, curiously enough, had never seen or heard of such a bird before; nor did their knowledge come forward when I referred to the Storm Petrel as "Mother Carey's Chicken." But since this pelagic little wanderer only comes to land for a few weeks to incubate its solitary disproportionate egg, and is very nocturnal in habits and small in size, it is perhaps no wonder that these fishermen have never noticed it.

Razorbill (*Alca torda*).—This bird and the next named are both called indiscriminately by the fishermen "Divers." They say they often take the Razorbill and the Guillemot on their lines when fishing at some considerable depth. In Sark the Razorbill breeds on Les Autelets, but apparently not nearly in such large numbers as the Guillemot.

Common Guillemot (*Uria troile*).—Their chief, and, I believe, only breeding station is on Les Autelets, and here a considerable number were at all times of the day to be observed sitting on the ledges, no doubt incubating their eggs. Les Autelets are practically inaccessible, though they have been scaled by some foolhardy climbers, so it was impossible to get near the breeding ledges, but round the base of the rocks several broken eggs were found.

Puffin (*Fratercula arctica*).—I think L'Etac is their only breeding haunt, being the only suitable islet providing a sufficient amount of soft earth in which to make their burrows. As we landed the Puffins flew out, and wheeled round and round this limpet-shaped dependency almost as thick as flies. This was on May 29th, and our boatmen thought we were too early for eggs, but in this they were both assuredly wrong, for the Puffin is not a late nester; and, after feeling about in a great many of their tunnels, and finding only one egg, and that very stained and hard-set, I was fully convinced that instead of being too early, the great business of the year was practically over. I caught one in its burrow, and it offered not the slightest resistance. At close quarters the Puffin is a grotesque little creature, and it was with much interest that we had a somewhat convincing demonstration with regard to the wonderful power of its adze-shaped bill. A piece of stick was selected, and the mandibles fastened on it like a vice, and brought home to one the undesirability of having one's finger substituted for the stick. The sitting bird always squats in the hole, with its head towards the entrance, and feeling about in the hole is best done with a gloved hand, and, on touching the bird, immediately grasp it firmly by the head before pulling it out, and then such a calamity as experienced by the stick will be averted as regards the human finger.

NOTES AND QUERIES.

MAMMALIA.

Mus sylvaticus wintoni in Suffolk.—With reference to the note on the occurrence of this species in Suffolk by the Rev. Julian G. Tuck (*ante*, p. 266), I may mention that I have often caught specimens at Plumpton, in the parish of Whepestead, five miles south of Bury St. Edmunds, and also at Brettenham Park, which is about ten miles south-east of the same town. It does not appear, however, to be nearly as common as *M. sylvaticus*, though its large size and bright colour, especially the orange patch on the chest, at once attracts attention. Probably it will be found to occur throughout the district now that the difference between the two species has been pointed out (*ante*, p. 150), and the present one becomes better known. Whilst on the subject of Mice, I may add that the Common Field Vole (*Arvicola agrestis*) also differs very considerably in size, and on one occasion I remember catching such a monster at Brettenham Park that I thought it must have belonged to a new species, and forwarded it to London for examination, but it was reported to be only an exceptionally large specimen of the common species; and I notice in Bell's 'British Quadrupeds,' 2nd edit. p. 326, he refers to two other forms which were previously described as separate species, viz. *A. neglecta* and *A. britannicus*, of which, however, he says: "The characters on which their distinction was founded were merely external differences of tint and proportions, which cannot in the least be depended on in so variable and difficult a family as the Voles." The one I caught was certainly far larger than any Field Vole I have ever seen in England before or since, and I have mentioned the fact in case the subject may be brought up at any time hereafter for discussion.—E. A. Butler (Plumpton House, Bury St. Edmunds, Suffolk).

Goat suckling a Lamb.—There is on the farm of Kilbride Bennan, Arran, a Goat, the property of Mr. Murchie, farmer there, which yearly suckles a lamb. The Goat is now thirteen years old, and every year she has had a lamb put to her, which she readily takes to, and suckles as if it had been her own kid. During the period of her suckling she has a plentiful supply of milk sufficient for the wants of her foster child; indeed, in one year she had two lambs put to her, and evinced great grief when one of them died. The most curious point, however, is that she has never had any progeny of her own, and has never had converse or association with any of her own species. I would be glad to hear if any case of a similar kind is known.—J. MacNaught Campbell (Kelvingrove Museum, Glasgow).

The Harp Seal (Phoca groenlandica) in Great Britain. — In a letter dated March 23rd, 1903, Mr. W. R. Hall Jordan, of Teignmouth, informed me that on March 10th he saw a very large Seal being wheeled about Teignmouth in a barrow by some fishermen. It had been shot in the River Teign, where it had been seen for four days previously. He describes the colour of the body as white, and the muzzle and front part of the head as black. This was obviously a specimen of the rare *Phoca groenlandica*, Fabr., and it is unfortunate that subsequent enquiries as to the disposal of the remains of this specimen have hitherto proved unsuccessful. The 'Manchester Evening News' of March 23rd, 1903, contains a paragraph stating that a Harp Seal (*P. groenlandica*) was killed in the Firth of Forth near Grangemouth, "a few days ago." Possibly the publication of these imperfect records may lead to the discovery of fuller details respecting the occurrence of this rare and interesting visitor.—Francis C. R. Jourdain (Clifton Vicarage, Ashburne, Derbyshire).

AVES.

Strange Nesting-place for a Mistletoe Thrush (Turdus viscivorus). Referring to the note on this subject (*ante*, p, 226), if Mr. Whitaker will refer to Messrs. Ussher and Warren's 'Birds of Ireland' he will find a couple of instances where this bird built on the ground. I found one nest this year in a tuft of bent-grass at the edge of a sand-bunker on the links of the Co. Lough Golf Club at the mouth of the Boyne. There were four eggs in the nest, and the bird was sitting on it. Unfortunately the caddies robbed it. This was about June 19th, so it was probably a second laying. There are plenty of trees within easy reach. The Mistletoe Thrush is supposed to be well able to defend its nest against other birds, but I saw a Rook this spring deliberately devour the newly-hatched young of a pair of Mistletoe Thrushes which had built in an apple-tree in my orchard. The parents were dashing about in great distress, but the Rook paid no attention to them.—G. H. Pentland (Black Hall, Drogheda).

Grasshopper-Warbler (Locustella nævia) in the Isle of Man.—When visiting the Curragh (an imperfectly drained depression of considerable extent at the foot of the Northern Hills, between Ballaugh and Sulby), with P. G. Ralfe and T. H. Graves, on May 30th last, we had the good fortune to hear the strange song of this Warbler. Although we had spent many hours in the Curragh, it was not until we were returning at about 9 p.m. that we heard the first song. Soon after we heard another, and altogether in a walk of half a mile in one of the lanes crossing the swamp we heard at least six birds singing; sometimes two could be heard together. This bird has not been noticed in Man before, but, judging by the number we heard in only a small part of this area, there must be a considerable number in the district. We stalked, and saw one of the singing birds at night, but the next day, after a prolonged search, we failed to see the bird or hear its song. [Ralfe heard another bird singing in the swamp near Ballacraine on June 7th.]—Frank S. Graves (Ballamoar, Alderley Edge).

Nesting of the Pied Wagtail (Motacilla lugubris).—I believe, as a rule, this species only nests *twice* in the season, but this year the pair that are in my garden have nested *three* times, and the hen bird is at present (July 27th) sitting on the third clutch of eggs close to the window of the room in which I am writing. There are only one pair of birds, and they arrive annually about the middle of March. I did not examine the first nest, but I saw four or five young birds running about on the lawn with the old birds at the end of April and beginning of May, and early in June a second nest was built in a hole in the wall, about three feet from the ground, just outside the window of my sitting room. A Long-tailed Field-Mouse (*Mus sylvaticus*) disturbed the nest one night, and carried off an egg, but the remaining four were hatched, and the young birds reared, and these also, like the first brood, frequented the lawn for several days with their parents. About July 20th I found the hen bird sitting on another clutch of eggs in a nest about ten yards from the site of the second nest, and on the same wall, about eight feet from the ground, but as it is in a creeper behind some trellis, and in rather a difficult place to approach without disturbing the sitting bird, I have decided not to examine it. Probably, however, it contains four or five more eggs.—E. A. Butler (Plumpton House, Bury St. Edmunds, Suffolk).

Tree-Sparrow (Passer montanus) in the Isle of Man.—On July 5th, 1902, I saw a pair of these birds in the trees bordering the high road at Kirby, near Douglas. These are the first birds of this species I have seen in Man; they probably had a nest close to where I saw them, as there are numbers of old trees on this estate, where suitable nesting-places would abound. This year (on June 22nd) I saw two, or possibly three, Tree-Sparrows at Ballamoar, Kirk Patrick, feeding in the farmyard with House-Sparrows, Chaffinches, and Yellowhammers. There are many old trees on this estate also. (Since writing the above I have heard from Mr. Ralfe that a Mr. F. W. Leach shot a specimen at Road Island, Braddan, on Jan. 5th, 1896, and he has observed the species on other occasions near Douglas.)—Frank S. Graves (Ballamoar, Alderley Edge).

Breeding Habits of the Pied Woodpecker.—When I was staying with my brother in Northamptonshire in June, we went one evening (23rd) for a stroll in a Fox-cover of mixed timber-trees with a heavy growth of big elder bushes. We had just visited the Badger-earths, and wondered afresh at the "roads" the Badgers had made when dragging herbage, sticks, leaves, &c., into their holes; and wondered too at the great patches of undergrowth beaten down flat by the Foxes, and at the numerous remains of their good living. The light was failing somewhat under the fir-trees as we walked along one of the rides, and a Fox had just crossed in front of us, when we heard a sound like the cry of a Barred Woodpecker, but, unlike the cry of that bird, the sound was continuous. We soon traced it to a hole in an old elder-bush, which evidently contained a brood of young Woodpeckers. The cries of the young birds were redoubled when I touched the tree, and the young birds, thinking that one of their parents had settled on it, tumbled up to the entrance in a hurry to be fed; but they dropped back again instantly, only affording me a momentary glimpse of them. And I may add that, although I subsequently tried several times at intervals, I could never get another rise out of them. The trunk of the elder-bush was only about ten inches in diameter, and the hole not more than three feet from the ground. This seems a curious nesting-place for the birds to choose, for there are plenty of good-sized trees in the cover, some of which are quite riddled with holes bored by the Green Woodpeckers, which are always to be heard and seen there. But I do not think that the Pied Woodpecker (*Dendrocopus major*), to which bird the nest proved to belong, cares to cut out a clean hole entirely for itself (as the Green Woodpecker does) if it can get one partly formed naturally. This particular hole was at a place where a branch had long ago been torn off, and the weather had got in at the wound and rotted the wood for some distance down into the stump of the tree. The birds had merely turned out the rotten wood (which lay at the foot of the tree), worked the sides of the hole out a little, and rounded off the edges of the entrance-hole, which was oval in shape, not round. I saw a Pied Woodpecker's nest in Wales last year, which was somewhat similar. It was in a small oak about twelve feet from the ground, in a place where a branch had been torn away from the trunk; the young birds were very noisy. To return to the former nest: when we were examining it we could hear the alarm-note "gik" or "chick" of one of the old birds, so we retired into the cover on the other side of the ride to watch. In a few minutes the old male came down and settled on the side of the trunk (where the bark was quite worn by the birds' feet), and then sidled round to the hole in front. The cries of the young were vociferous. The male remained at the entrance for a minute or two, popping his head forward into the hole, and, I think, feeding the young; then he went inside for a few minutes, came out, and flew away. It was now dusk, and we went home. Returning to the spot the next morning, we noticed that we could hear the young birds quite plainly when we were sixty yards from the tree. We repeatedly saw both old birds close to the tree, and they even settled on it; but, though we had hidden ourselves much more carefully than on the previous evening, and at a greater distance from the tree, they would not feed the young, or go quite to the hole while we remained. While watching them I repeatedly heard one of them (certainly the female in some cases) utter a curious cry, sounding like "trah" or "tray," but the note they used chiefly was the ordinary alarm cry "gik" or "chick." I almost wonder some of the numerous Foxes (one of which crossed the ride in front of us about noon that day) had not tried to get at these young birds, which took such pains to betray their presence.—O. V. Aplin (Bloxham, Oxon).

Honey-Buzzard in Cheshire.—On the evening of June 5th an immature Honey-Buzzard (*Pernis apivorus*) was shot in a ride in one of the woods in Tatton Park. The bird lacks the grey head which characterizes the adult, but resembles in the mottled brown and white of the under parts, and the general character of its upper plumage, an old male from Altenkirche, which is in the Dresser collection in the Manchester Museum, and is figured on the third plate devoted to this species in the 'Birds of Europe.'—Chas. Oldham (Knutsford).

British Grey Geese.—I am glad to see this matter cleared up, as I consider it to be, by Mr. H. W. Robinson. I have compared several specimens, supplied to me from the Outer Hebrides and Tiree Point, and a considerable time ago came to the same conclusions as he has done—that differences in coloration are due to age; that differences in size are due to age; that the dark-breasted White-fronted Geese are old birds, and the mottled-breasted birds are young ones; that the white on the face, and especially on the lower mandible or feathers of the chin, are signs of immaturity and not of old age; and that coloration of the soft parts is also no criterion. North American Snow-Buntings of large size might be separated similarly from the European; the *dark*-backed Sand-Martin of east of the White Sea might be separated from our Sandy-backed Martin of Britain, and perhaps have some right to be described, as the usual order of geographical variation between eastern and western specimens reversed—that is, we might expect to find lighter-coloured and not darker-coloured Sand-Martins to the east than in the west, but this is not so. I suspect old Aristotle gauged these Geese fairly well, as described in 'Zoologist' (*ante*, p. 248), and present-day naturalists will not be very far out if they leave them alone now. I write, with the breast of a White-fronted Goose before me, which is almost *black*, the broad bands merging into one another all over; and the other extreme, faint grey breast mottled all over with black ticks. This latter bird has the white chin. An intermediate one has dark black bands on breast showing signs of merging, and has *no* white on the chin nor below the gape, only on the front of forehead. With regard to *Anser rubrirostris*, I have no remark to make, except that *free translation* of German sentences, graceful or ungraceful, is a "ticklish tail to tackle" at any time.—J. A. Harvie-Brown (Dunipace, Larbert, Stirlingshire, N.B.).

Tufted Duck in Merionethshire.—When passing Bala Lake in the train early in the morning of May 23rd, I saw, close inshore, near the upper end of the lake, three Tufted Ducks (*Fuligula cristata*), which seemed to be a male and two females. I passed the lake on the 12th, and again just a month later, without seeing them; but Mr. A. H. Macpherson saw probably the same three Tufted Ducks on May 29th and June 1st, each time about the same place. I do not remember if this Duck has yet been recorded as breeding in Wales; neither do I know if the Ducks I saw were breeding.—O. V. Aplin (Bloxham, Oxon).

Stock-Dove (Columba œnas) in the Isle of Man.—Frequently during the last few years I have seen a few Pigeons which I thought were Rock-Doves or feral birds, about a certain part of the coast on the west of the island, but, owing to their wildness, I could never get near enough to them to see definitely to which species they belonged. On May 18th, 1902, I disturbed a pair from some broken piled-up rock full of crevices and holes near the foot of a steep sea-brow. Feeling sure these could not be Rock-Doves, I hid and watched for their return, and then saw they were "Stock-Doves," and were without doubt nesting in the crevices. Although I searched carefully, I failed to find a nest. Soon after, near the same place, I saw three more birds, and a day or two later, another flying over an inland rocky mountain slope, where I had been told, when a boy, that Rock-Doves nested. It seems that only one other Stock-Dove has been recorded in the Isle of Man, that one being shot in November, 1900, from a flock near Castletown.—Frank S. Graves (Ballamoar, Alderley Edge).

The Rock-Dove (Columba livia) in Somerset.—I think the remark quoted by Mr. Stanley Lewis (p. 230) rather tends to prove that the birds in question were *not* genuine wild Rock-Doves, for these birds do not have "checkered wings," although "blue checker" is a common colour in blue dovecot Pigeons.—O. V. Aplin (Bloxham, Oxon).

[Probably Mr. Stanley Lewis can procure a skin, and thus settle the question one way or the other.—Ed.]

Water Rail (Rallus aquaticus) in the Isle of Man.—On June 6th, 1903, when again searching the Curragh, I flushed a Water Rail from a nest containing eight eggs, and found two other nests empty. On June 21st I found a fourth nest, with six eggs, within about forty yards from the first one with eggs. I have only heard of one nest of this bird having been found in Man before, but each winter a few birds are shot. Possibly this is not an uncommon nesting species in this district, and other similar places in Man.—Frank S. Graves (Ballamoar, Alderley Edge).

Breeding of Lesser Black-backed and Herring-Gulls.—Does Mr. Elms, in his "Bird Notes in Sark" (*ante*, p. 261), mean that he actually saw the Lesser Black-backed Gull (*Larus fuscus*) and Herring-Gull (*L. argentatus*) sitting side by side on one nest?* Otherwise, I fancy it would be difficult to prove the statement of the boatmen that these birds commonly lay in and share the same nest. Fishermen and others will often tell you that they can distinguish at a glance the eggs of these two birds; if so, they have a keen sense for minute differences, which has been found lacking in many an eminent ornithologist, Seebohm included, who says: "It is very important that eggs of this species (i.e. *Larus fuscus*) should be carefully identified, as many of them are indistinguishable from those of the Herring-Gull" ('British Birds,' vol. iii. p. 321). On Mullion Island, off the Cornish coast, there is a large colony of Herring-Gulls, which I frequently visit. Amongst the nests of these birds, thickly scattered on the top of the island, both on the bare rock and the grassy portion, a few pairs of the Lesser Black-backed nest; while on a small island near Oban, N.B., the reverse is the case. This colony is that of the Lesser Black-backed, with an occasional pair of Herring-Gulls. In both these colonies I have identified and examined many nests, and for nearly every shade of colouring of the eggs of the one bird have found a similar egg of the other, except that I have not as yet identified an egg of the Herring-Gull, with the peculiar black-ink-like scratchings, which are sometimes found on the egg of the Lesser Black-backed. With most of the Gulls it is common to find the three eggs differing very much in colour, markings, and size, but this does not prove that they are not the eggs of the same bird; nevertheless birds may, and probably do, make mistakes sometimes, especially the gregarious species, which possibly also accounts for the occasional clutches of more than three eggs in the nests of Gulls. Only this season I found in Scotland the nest of a Mallard (*Anas boscas*) containing ten similar and typical greenish-white eggs of the Wild Duck, one of them which I have measured being 2·2 in. × 1·7 in., while an eleventh egg in the nest was much larger, and of a buffish tint, measuring 2·5 in. × 1·8 in. This latter I take to be the egg (which it resembles in size and tint) of the Red-breasted Merganser (*Mergus serrator*), deposited in the Mallard's nest.—H. HOLROYD MILLS (Treslothan Vicarage, Camborne, Cornwall).

---

* Mr. Elms has some further remarks thereon in this issue (*ante*, p. 308).—Ed.

Birds mentioned by Aristotle.—When Aristotle says (*ante*, p. 247) that the *laros* hatches out its young in summer (whereas the *aithyia* does so in early spring) he was perhaps alluding to a Tern ("among rocks" need not necessarily mean "in rocks"). Terns in this country breed much later in the year than Gulls. *Laros* in Greek seems to include both Gulls and Terns (*vide* Professor D'Arcy Thompson's 'Glossary of Greek Birds,' p. 111); *aithyia* is clearly some kind of Gull.—O. V. APLIN (Bloxham, Oxon).

Birds and Sound of Firearms.—Seeing Mr. Distant's interesting note about birds under fire (*ante*, p. 276), I thought the following might interest some readers of this Journal:—About two years ago I was trying the pattern of a new 12-bore gun, and alongside me, in a hedge not four feet away, was a party of Blue Tits (*Parus cæruleus*) hunting for insects. I fired off a good many cartridges, but it did not seem to disturb them in the least. Perhaps these small birds, like the Weaver and Tits, have not such highly developed brains as to make them take fright at sudden noise; their power of hearing is probably not so well developed as that of sight, for one often finds a sudden movement frightens a bird much more than a noise.—W. H. WORKMAN (Windsor, Belfast).

NOTICES OF NEW BOOKS.

The Big Game Fishes of the United States. By CHAS. FREDERICK HOLDER. New York : The Macmillan Company.

THIS book is addressed to the angler, but it is also an addition to the naturalist's library. To capture with rod and line piscine monsters weighing from 200 to 400 lb. is a new adventure for Mr. Piscator, and many members of the gentle craft will register a resolve to visit the Floridan and other American oceanic fishing grounds. But the zoologist will not read these pages in vain; many facts are recorded which only an angler would collect and a naturalist observe. Mr. Holder has written lives of both Charles Darwin and Louis Agassiz, and is therefore considerably more than the ardent sportsman.

The Black Sea-Bass (*Stereolepis gigas*) frequents the submarine forests of the Californian coasts. "The trees are represented by the so-called kelp, the *Macrocystis*, which attains a length of several hundred feet, rising upward in broad deep green leaves of gigantic size, which swing in the current, undulating like living things, forming a maze or forest, which, while easily seen, is a closed region even to the diver, owing to the convolutions of the plants." A specimen of this fish, weighing 419 lb., has been taken with rod and line. The Bluefish (*Pomatomus salatrix*) is another so-called game-fish, affording much sport to the angler. These fish are most voracious; the author has seen them charge a school of small Mackerel, "leaving the water filled with silvery fragments," and when "crazed by the excitement of the chase, amused themselves by biting the fleeing victims for the mere wanton pleasure of killing." Prof. Baird estimates that a thousand millions of Bluefish may be found off the American coast in summer, and if each one eats ten small fish per day, then ten thousand millions of small fry must be consumed daily by these fishes alone. Another destructive fish is the Drum (*Pogonias cromis*), visiting the Oyster-beds, and crushing the succulent bivalves like paper in its powerful jaws. These fish are often found in vast schools, each fish weighing from forty to sixty pounds, and one of these devastating hosts was captured in a seine a few years ago, and numbered 218, and weighed nearly 9000 lb. Our space forbids further extracts, though we might quote equally interesting facts relating to the Tarpon (*T. atlanticus*), which has been seen by an angler to make "a thirty-foot horizontal leap," and has been captured by rod and reel of a weight of 213 lb. The Leaping Tuna (*Thunnus thynnus*), of which specimens weighing 1000 lb. have been harpooned, and an example weighing 251 lb. fairly caught with usual angling tackle, divide into small squadrons of from fifty to two hundred, and move "in the general form of flying ducks or geese, a large triangular figure, with one or two large fishes perhaps in the lead." But we must pause—the subject is too enticing; the book can be read with pleasure and instruction by both naturalist and angler, and it is beautifully illustrated.

A Naturalist's Calendar kept at Swaffham Bulbeck, Cambridgeshire. By LEONARD BLOMEFIELD (formerly JENYNS). Edited by FRANCIS DARWIN. Cambridge: University Press.

THIS Calendar, relating to plants, birds, and insects, was founded on observations made near Cambridge between the years 1820 and 1831, and is a model of method in bionomical record. Blomefield's observations are neither trifling nor redundant. He is almost painfully concise and accurate. He tells us that his school-fellows nicknamed him *Methodist*, and that through life "I have been a man of few words." Perhaps the most momentous event in his life was his refusal to go as naturalist with FitzRoy in the 'Beagle.' This may be said to have prepared the way for the foundation of the "Darwinian epoch." We are all sometimes dumfounded when we see the mere accidents that seem to promote or prevent man's intellectual evolution. Remove the 'Voyage of the Beagle' from Darwin's career, and to-day the whole of modern thought might have been of a totally different trend. And this was made possible by the refusal of Blomefield "after a day of hesitation." He, however, subsequently described the fish in the "Zoology" of the 'Voyage.' As a naturalist, Blomefield was known for his "minute and scrupulous exactness in matters of fact."

BRITISH 4 SE 1903 MUSEUM

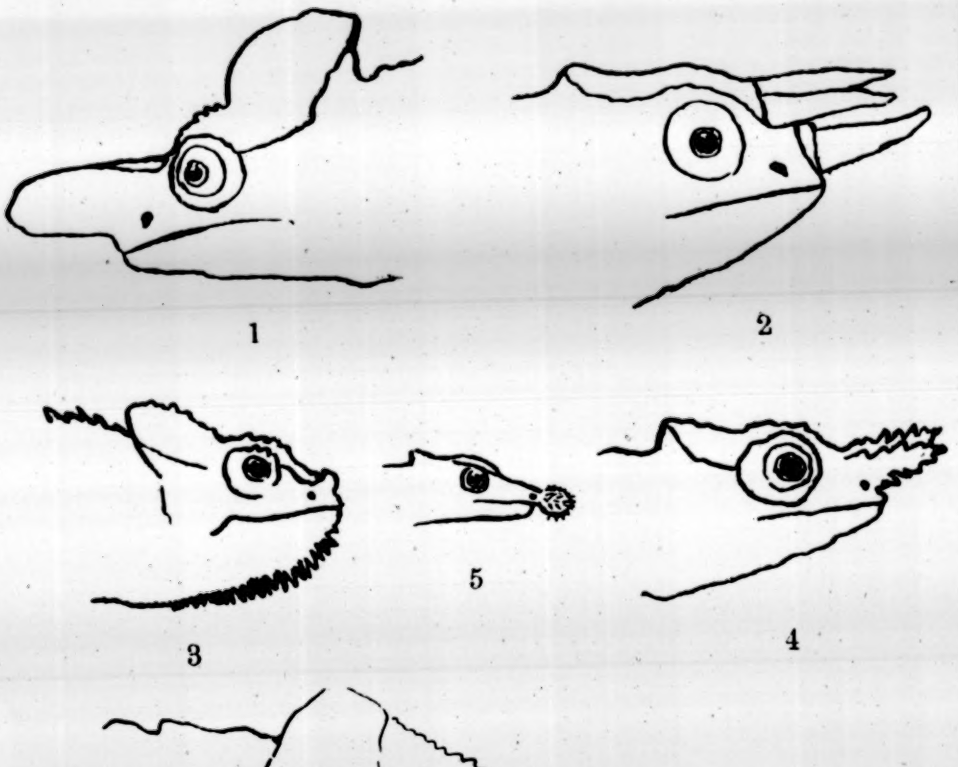

Fig. 1. *C. xenorhinus.*
2. *C. johnstoni.*
3. *C. hoehneli.*
Fig. 4. *C. tavetensis.*
5. *C. spinosus.*
6. *C. melleri.*
7. *C. parvilobus.*
8. *C. dilepis.* } showing difference in size of occipital lobe.

BRITISH MUSEUM 4 NO 1903